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MANHATTAN DISTRICT HISTORY
PROJECT Y
THE LOS ALAMOS PROJECT

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by

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and
Ralph Carlisle Smith

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LOS ALAMOS NATL. LAB. LIBS.



Chapter IX

DOCUMENTARY DIVISION

Introduction

9.1 In the development of the Laboratory from its inception in 1943, a substantial number of technical staff groups were formed in order to solve the special problems as they were encountered. All of these groups reported directly to Project Director, Dr. J. Robert Oppenheimer, and later to Dr. N. E. Bradbury, as Laboratory Director. Some of these groups were dissolved when the functions were transferred to other agencies or with the disappearance of the problems involved.

9.2 The technical staff organization functioned effectively by reason of the full acceptance of responsibility by the very competent group leaders with little or no supervision from the Director (2.5). These group leaders in many cases were men with outstanding professional background which made them exceptionally valuable in other fields of endeavor. For example, Ph.D.'s and graduate students who had majored in theoretical physics, mathematics, and philosophy were engaged in technical editorial work, cataloging, report writing, declassification procedures, and history preparation.

9.3 With the general exodus of personnel, starting in the fall of 1945, many of these group leaders left these assignments for other activities. As a result, the functions of some of these groups were interrupted or left in the hands of remaining junior members who needed direction. The relaxation of security from the wartime stringency which compartmentalized substantially all activities, and the consequent greater exchange of information between projects, permitted the establishment of central uniform Manhattan Project procedures for the handling of much technical information. This required considerable alteration of the informal wartime practices of the Laboratory.

Consequently, there was a great burden thrust on the Director to effect many new procedures while at the same time he was losing most of his unusually well-trained technical staff for handling these matters. The many other responsibilities of the interim period discussed in Chapter I prevented the Director from giving these staff functions any considerable time; hence, the groups tended to lose their effectiveness.

Formation of D-Division

9.4 When Major Ralph Carlisle Smith, the local Patent Advisor, returned from his security and technical advisory assignment to the Operations Crossroad press ship, U.S.S. Appalachian, he was requested by the Director to consolidate the technical staff groups, other than the health group, into a division, and ultimately to take over the duties of an Assistant Director. On August 21, 1946, the Director announced the formation of the Documentary (D) Division with the responsibility for Technical Series editorial work; the Document Room; the Technical Library; editorial revision, review and control of reports; information dissemination; declassification; history; and various other technical services, with Major Ralph Carlisle Smith as Head and Herbert I. Miller as alternate. Although the contractor did not assume responsibility for Patent control, this being the delegated responsibility to Smith from the OSRD Patent Advisor, Captain R. A. Lavender, U.S.N. Ret., this control was exercised in the Documentary Division as a dual responsibility of its leader. Later when Mr. E. J. Demson left the project in 1946, Major R. C. Smith also accepted the project responsibilities of an Assistant Director, particularly the legal duties of Mr. Demson. This new arrangement removed a considerable load from the Director and by reorganization of the accumulated staff groups, so as to use the available professional personnel in several phases of the work, it was possible to improve the services of the staff groups with a smaller number of employees. The responsibilities were generally divided as follows: Patents and Legal, Library and Document Room, History and Technical Series, Report Editing - Review, Classified Information Dissemination, Declassification, Drafting (Patents, Reports and Miscellaneous), Technical Illustrations and Art Work.

9.5 The group organization for D-Division during 1946 was the following:

D-1	Legal	Ralph Carlisle Smith
D-2	Library	G. F. Campbell
D-3	Review and History	R. R. Davis
D-4	Editorial	J. F. Mullaney
D-5	Design and Drafting	L. F. Jacot
	Records and Administration	A. M. Frazier

9.6 Most of the functions of D-Division have been covered in the discussion under the technical staff groups of Vol. I, (3.82 to 3.87 and 3.123 to 3.128). There are a few phases, however, which are new and which merit additional comment.

THE TECHNICAL SERIES*

9.7 In conformity with other sections of the Manhattan Project, a program was initiated to record, in accessible and edited form, the technical knowledge and gains of the Laboratory. In principle, it was proposed to prepare a "Handbuch der Los Alamos" in analogy with the famous Handbuch der Physik. Titles for seventeen volumes were established in August 1945, as well as volume, and, in some cases, chapter and section editors. Difficulty in establishing a title for the over-all work arose. The original name "Handbuch der Los Alamos" was misleading in its English translation, so the title Los Alamos Encyclopedia was substituted. But inasmuch as it was decided that "encyclopedia" implied an alphabetical arrangement, that too was discarded and the "Los Alamos Technical Series" was finally chosen (Appendix 7).

9.8 Dr. Hans Bethe and Dr. David Inglis were originally responsible for this compilation with the following staff of volume editors

Volume No.	Title	Editor
0	"Relation Between the Various Activities of the Laboratory"	S. K. Allison
1	"Experimental Techniques"	Darol K. Froman
2	"Numerical Methods"	Eldred C. Nelson
3	"Nuclear Physics"	R. R. Wilson
4	"Neutron Diffusion Theory"	George Placzek
5	"Critical Assemblies"	O. R. Frisch
6	"Efficiency"	V. F. Weisskopf

*See editor's note, Appendix 7.

Volume No.	Title	Editor
7	"Blast Wave"	Hans A. Bethe
8	"Chemistry of Uranium and Plutonium"	Joseph Kennedy
10	"Metallurgy"	Cyril S. Smith
11	"Explosives"	G. B. Kistiakowsky
12	"Implosion"	R. F. Bacher
13	"Theory of Implosion"	R. E. Peierls
21	"The Gun"	F. Birch
22	"Fuzes"	R. R. Brode
23	"Engineering and Delivery"	N. F. Ramsey
24	"Trinity"	K. T. Bainbridge

9.9 Only Volumes 1 and 2 have been considered completely declassifiable under the existing standards. However, a substantial portion of the information in some of the others will eventually be declassifiable and, with the exception of the weapon data, the remainder was to be distributable throughout the Manhattan Project for its general benefit.

9.10 Shortly after the initiation of the program, Dr. David Hawkins and Robert R. Davis were assigned the responsibilities of the Technical Series because of the imminent departure from Los Alamos of both Dr. Bethe and Dr. Inglis. When Dr. Hawkins left the project in the late summer of 1946, Robert R. Davis took over the detail as a group leader in D-Division.

9.11 The Technical Series compilation has proceeded at a slow rate since the time of its inception. Exceptional delays resulted because many individuals were reluctant or unable to continue obligations, taken on while at Los Alamos, after their departure. A more understandable difficulty was experienced by active project personnel who were faced with the problem of conducting an active technical program while writing about one accomplished in the past.

9.12 By January 1947, Volume 0 and 22 were completed and issued, and two-thirds of Volume 1 had been issued.

DESIGN AND DRAFTING GROUP

9.13 The Technical Series Group and the Technical History Group had acquired a drafting section for the purpose of illustrating their volumes. In addition, a design and drafting section was in existence to aid the Patent Group. The Report Editorial Group was serviced by the Shop Group Drafting Section, A-3, and the Post Historian used the Post Operation drafting staff

in the Army Civil Service organization. Furthermore, the Ordnance Engineering (Z) Division had a Technical Illustration Group that was required to prepare exploded views of the weapons and their components, to do general art work for the project, and to do instructive illustrations for the manuals prepared by Z Division on weapon assembly and handling, and by X Division on high explosive and detonator production techniques. The Technical Series, History, Patent, and Technical Illustration Drafting Sections were combined into a single Design and Drafting Group so that duplication of effort would be avoided, and the over-all staff group personnel requirements would be reduced. In addition, groups of the Documentary Division were no longer required to call on outside drafting agencies, thus relieving their work load.

9.14 It was found that one-half the drafting staff was able to carry the entire load and, in addition, the year back-log of work in the Report Editorial Group was completely wiped out, not only by completing illustrations, curves, diagrams, and the like for the reports, but also in the detailed and tedious printing of involved mathematical formulas by the drafting group. The Technical Illustration and Art Staff functioned substantially independently of the remainder of the group, but by limiting its responsibility, it was able to direct its effort to the primary assignment of preparing exploded views, manual illustrations, and art work so that considerably greater production resulted.

DECLASSIFICATION PROGRAM

9.15 Shortly after the termination of hostilities, many individuals requested permission to publish papers on phases of the Laboratory research and development which they did not consider classified. The procedure for handling these items was not clear-cut and generally unsatisfactory. A few items were released through the local Security Office by its Washington headquarters, but the informal and uncertain treatment left much to be desired.

9.16 After the Tolman Committee recommendations on a program of declassification were adopted by the Manhattan Engineer District, the Laboratory established in June 1946 a special scientific staff under the direction of Frederic de Hoffmann, on loan from Harvard College, to review all the Los Alamos formal reports to see which might appropriately be submitted for declassification. Many reports required careful rewriting in order to remove classified information or to overcome indications of classified applications.

9.17 A procedure was established whereby a member of the technical staff of the Declassification Group reviewed a report or a rewritten version thereof to determine whether or not it should be submitted for declassification.

When a report was so approved for processing, it was routed (1) to the Technical Series Editor to be certain it was adequately covered in that compilation, (2) to a Responsible Reviewer, a senior member of the Laboratory scientific staff, to be approved for declassification according to a Guide prepared on the basis of the Tolman Committee recommendations, (3) to the Patent Advisor to be assured that the Government's interest was protected from a patent standpoint, (4) to the local Army Security and Intelligence Officer as a check against unnecessary revelation of physical security safeguards, (5) to the group leader of the Declassification Group to be certain that no releases were made on associated project work without permission from that project, and to send abstracts to the Manhattan Project Editorial Advisory Board for approval of publication, and (6) finally to the Laboratory Director for general over-all review and approval for submission to Oak Ridge declassification headquarters for declassification.

9.18 Although the foregoing routing seems involved, it was found that once the report was put in shape for submission for declassification, the processing could be accomplished in a day, except for the time required for detailed review by the responsible reviewer, and the patent advisor. Allowing ten days for review of a document by the Manhattan Project Editorial Advisory Board, declassification has been effected in a period of about two weeks if the subject matter has been clearly releasable. Of course there have been questionable cases and some items which have been refused declassification.

9.19 About 320 documents had been routed for declassification by December 31, 1946. Approximately 700 more were considered by the declassification group but never assigned numbers for routing because it was determined they were not declassifiable by that group. Of those processed, about 250 made the entire round and were approved for declassification in Oak Ridge before the end of 1946. It appears that about 50 of these documents were approved for publication or published in recognized scientific journals during the same period. The Laboratory is proud of its contribution to the scientific literature of the country.

9.20 An incidental service established by the declassification group, with the cooperation of the Library and Document Room, is the loan of declassified documents to former Laboratory staff members now engaged in research at other private and public institutions. These loaned documents are not considered publications but only private communications. They are loaned, not only for the purpose of aiding research in the nation, but also to advise the former staff members as to the extent of declassification and the limits of information which may be disclosed to others who did not have access to classified material. In the latter respect, it is believed to be a valuable security measure.

CATALOG OF COURSES

Hours: Mon. 9:00 - 10:15 a.m. Sigma 47
Thurs. 10:30 - 11:45 a.m. Sigma 47

Prerequisites: A. B. Degree in Physics, or equivalent amount of undergraduate Physics; Differential Equations.

Textbook: "Whitaker Analytical Dynamics"

Description of Course: A course in the dynamics of particles, rigid bodies, elastic media, and fluids. Topics to be taken up will include vector analysis; particle dynamics; Lagrange's equations; Hamilton's equations; rigid body dynamics; vibrating systems; coupled systems and normal coordinates; dissipative systems; elastic media and hydrodynamics.

72. Electro-Magnetic Theory

Lecturer: H. A. Bethe

Hours: Tues. & Fri. 10:30 - 11:45 a.m. Rm. B-223

Prerequisite: Calculus, Differential Equations, and an undergraduate course in Electricity and Magnetism, or its equivalent.

Textbook: Abraham & Becker (Recommended.)

Description of Course: The course will start by setting down and explaining Maxwell's equations. Various phenomena will be derived from these equations; a relatively short time will be devoted to electro-statics, an extensive treatment will be given of stationary currents and their magnetic fields and of high frequency electromagnetic waves. Electromagnetic cavity resonators and wave guides will be discussed. Relativity electrodynamics will conclude the course.

73. Statistical Mechanics

Lecturer: L. I. Schiff

Hours: Mon. 9:00 - 10:15 a.m. Gamma 49
Thurs. 10:30 - 11:45 a.m. Gamma 49

Prerequisite: Theoretical Mechanics and Modern Physics
Quantum Mechanics desirable.

Textbook: "Statistical Mechanics" - Tolman (Recommended.)

CATALOG OF COURSES

Description of Course: First Part, General Theory (8 to 10 weeks). Introduction; classical statistical mechanics; detailed balance and the H-theorem; quantum statistical mechanics. Second Part, Application (6 to 8 weeks). (It will probably be possible to discuss briefly 3 or 4 of the topics listed below; these will be selected in consultation between students and instructor.) Free electron theory of metals; specific heats; electromagnetic radiation; fluctuations; imperfect gases; atomic nuclei; cooperative phenomena; equilibria in gases; reaction rates in gases.

74. Elementary Quantum Mechanics

Lecturer: E. Teller

Hours: Mon. & Wed. 10:30 - 11:45 a.m. Rm. B-223

Prerequisite: Theoretical Mechanics; Electromagnetic Theory;
Differential Equations

Textbook: None for the time being.

Description of Course: A systematic description of the laws of quantum mechanics and their relation to classical physics. Specific topics to be discussed: correspondence principle, wave-particle dualism, uncertainty principle, Schrodinger- and matrix-formulation of quantum mechanics, the electron spin.

75. Nuclear Physics

Lecturers: Manley and Weisskopf

Hours: Tues. & Thurs. 9:00 - 10:15 a.m. Rm. B-223 (Section I)
Wed. & Fri. 7:45 - 9:00 p.m. Rm. B-223 (Section II)

Prerequisites: One semester Quantum Mechanics; Modern Physics
(Atomic Spectra, Structure Elementary Particles.)

Textbook: None

Description of Course: 1. Elementary particles and properties; 2a. Systematics of Nuclear Structure; nuclear reactions; alpha decay; fission. 2b. Observational methods. 3. Deuteron system, p-n scattering. 4. Theory of beta and gamma decay. 5. Theory of nuclear reactions.

CATALOG OF COURSES

76. Neutron Physics

Lecturer: E. Fermi

Hours: Tues. & Thurs. 9:00 - 10:15 a.m. Sigma 47

Prerequisites: Differential equations; introduction to theoretical physics; a knowledge of the elements of Nuclear Physics; Introduction to Quantum Mechanics desirable.

Textbook: None

Description of Course: Neutron sources (radioactive sources, accelerating machines, piles) (1). Neutron reactions (capture, scattering, etc.) (6). Neutron detection (fast detectors - radioactive detection, counters, fission counters, etc.) (3). Slow neutrons (include diffusion theory, velocity selector) (6). Fission by neutrons, Chain reaction (2). Slow neutron piles (10). Fast neutron chain reactions (6).

77. Hydrodynamics

Lecturer: R. E. Peierls

Hours: Wed. & Fri. 4:15 - 5:30 p.m. Sigma 47

Prerequisites: Theoretical Mechanics, Differential Equations.

Textbook: LA-165

Description of Course: Kinematics of continuous medium. Lagrange and Euler variables, equation of continuity; Hydrostatics, Stresses, Definition of ideal fluid; Euler's equation; Bernoulli's theorem. Conservation laws. Vorticity; Thomson's theorem; Irrotational flow. Potential theory; Method of images; Complex variable; Flow around sphere and cylinder; Mapping; Flow around a corner; Airfoil theory; Application to free surfaces; Vortices. Viscosity; Equation for viscous flow; Poiseuille formula, flow between plates; Stokes law; Turbulence; Laws of similarity; Reynolds number; Examples of critical Reynolds numbers; Resistance coefficient; Boundary layers; Heat transfer; Theories of turbulence. Compressible fluids; Sound waves; Sound waves in medium of varying properties. Supersonic flow; Mach angle; Characteristics; Short waves; Hugoniot conditions; Rayleigh-Taylor theory. Interaction of short waves.

CONTENTS OF THE LOS ALAMOS TECHNICAL SERIES

Volume No.	Title and Description	Editor
0	<p>"Relation Between the Various Activities of the Laboratory"</p> <p>(A general survey of the work of the Los Alamos Laboratory during the war years, with particular emphasis upon the problems of the critical mass and of the efficiency. In addition to a discussion of the gun and implosion type bombs, the volume contains a section dealing with other methods of attaining the explosive release of nuclear energy.)</p>	S. K. Allison
I	<p>"Experimental Techniques"</p> <p>(A description of the experimental physics equipment used by the Los Alamos Laboratory. The volume has three parts: the first dealing with electronics; the second with ionization chambers and counters; and the third with miscellaneous techniques used in obtaining physical measurements.)</p>	Darol K. Froman
II	<p>"Numerical Methods"</p> <p>(A survey of the methods used in performing numerical calculations of various types of equations by hand computation and with the use of International Business Machines.)</p>	Eldred C. Nelson
III	<p>"Nuclear Physics"</p> <p>(A comprehensive report of nuclear physics measurements made by the Los Alamos</p>	R. R. Wilson

Volume No.	Title and Description	Editor
	Laboratory, together with theoretical evaluations of results and a detailed discussion of the fission process.)	
IV	"Neutron Diffusion Theory" (The theory of diffusion with and without a change in velocity, including a discussion of statistical fluctuations.)	George Placzek
V	"Critical Assemblies" (A report of critical mass experiments made at Los Alamos with uranium-238 and plutonium assemblies for various tampers. A theoretical discussion is included.)	O. R. Frisch
VI	"Efficiency" (A theoretical method for calculating the energy release of a nuclear explosion.)	V. F. Weisskopf
VII	"Blast Wave" (A study of blast wave phenomenon, both from a theoretical and an experimental point of view. Particular emphasis is placed upon the behavior of the blast wave in large explosions, and an effort has been made to interpret blast data from studies made at Trinity, Hiroshima and Nagasaki.)	Hans A. Bethe
VIII	"Chemistry of Uranium and Plutonium" (A survey of the problems concerned with the chemical purification and recovery of uranium and plutonium, together with a discussion of the preparation of their various compounds and of the analytical methods used in their study.)	Joseph Kennedy
IX	Not assigned.	

Volume No.	Title and Description	Editor
X	<p>"Metallurgy"</p> <p>(A report on the metallurgy of uranium, plutonium and all other metals fabricated by the CMR Division.)</p>	Cyril S. Smith
XI	<p>"Explosives"</p> <p>(A survey of the experimental work done by the Los Alamos Laboratory on the behavior of explosives and on the techniques of explosive casting.)</p>	G. B. Kistiakowsky
XII	<p>"Implosion"</p> <p>(A report on the experimental implosion program from the early tests to the development of the Trinity bomb. The volume covers work done on polonium, radio-barium and radio-lanthanum.)</p>	R. F. Bacher
XIII	<p>"Theory of Implosion"</p> <p>(A theoretical survey of the implosion process. The volume contains discussions of shock hydrodynamics, equations of state and various implosion designs.)</p>	R. E. Peierls
XXI	<p>"The Gun"</p> <p>(A survey of the experimental gun program from the early tests to the development of the Hiroshima bomb. This volume includes design specifications and a discussion of the interior ballistics of the gun.)</p>	F. Birch
XXII	<p>"Fuzes"</p> <p>(A study of work done by the Los Alamos Laboratory in designing detonating fuze assemblies for the implosion and gun type bombs.)</p>	R. B. Brode

Volume No.	Title and Description	Editor
XXIII	<p data-bbox="384 337 786 364">"Engineering and Delivery"</p> <p data-bbox="384 391 1007 596">(The history of Project "A" together with a discussion of engineering problems encountered in the delivery program. Particular attention has been given to the mechanical design and assembly of the Model 1561 implosion bomb.)</p>	N. F. Ramsey
XIV	<p data-bbox="384 638 512 665">"Trinity"</p> <p data-bbox="384 692 1066 1004">(A complete report on the 100 ton TNT calibration and rehearsal shot and the July 16, 1945 atomic bomb test at the Alamogordo Air Base. The volume includes both experimental and theoretical discussions of the various phases of the test. A large appendix contains all pertinent Trinity memoranda and all LA and LAMS reports concerning the Trinity explosion.)</p>	K. T. Bainbridge